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GUATEMALA

The Land of the
Hard-Shelled Avocado

BY
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YORBA LINDA, CAL.

GUATEMALA

The Land of the Hard-Shelled Avocado

I left Los Angeles for the Republic of Guatemala, Central America, in the spring of 1914, to bring back, if possible, buds of the famous Hard-Shell avocados grown in that country. I left via the Southern Pacific for New Orleans, where I took passage on one of the United Fruit Company's steamers for Puerto Barrios, Guatemala. I took moss, oiled paper and tags with me, besides the most important necessity—a special permit from the United States Department of Agriculture to import the buds I hoped to bring back with me. The permit was delivered to me at the last moment, and it cost me \$40.00 in cables, after I arrived in Guatemala, to rectify a mistake in the wording.

I left Puerto Barrios on the International Railroad and traveled through many miles of banana farms. The United Fruit Company has about forty thousand acres of bananas in that district and is planting about 10,000 acres more each year. Up we climbed from the low, hot coast through valleys and narrow river beds, through tunnels and over bridges until we passed over the divide at an elevation of more than five thousand feet. Then I could look down upon the beautiful city of Guatemala. Guatemala City is the Capital



Antigua, Guatemala. Cathedral, Volcans de Agua, Government Palace.



Fountain and Monument to Padre Sera



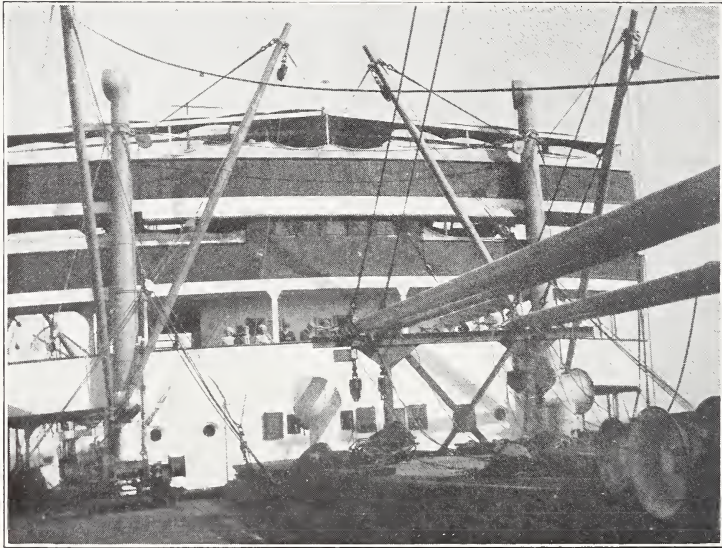
Ruins of Antigua, Guatemala.



La Merced Church, Antigua, Guatemala.



Port of "San Jose de Guatemala."



S. S. Hathor on Which Buds Were Shipped.

of the Republic of Guatemala, and has sixty thousand inhabitants and many fine buildings.

From Guatemala I went to Antigua, which can be reached only by traveling over a rough mountain road for about thirty miles on the other side of the mountain, but it is well worth the trip. It is situated in a lovely little valley with two volcanoes each over fourteen thousand feet high, looking down upon the city. One of these volcanoes is constantly smoking and often shakes the surrounding country. Antigua Guatemala means Ancient Guatemala, for this town was the old capital until about 150 years ago, when an earthquake destroyed it. The ruins are still there and are very interesting and beautiful. Antigua is one of the best coffee producing states of Guatemala, but because of its high altitude it is subject to heavy frosts. Coffee is as tender as lemons, and to overcome the bad consequences, it is planted underneath large trees of Hard-Shell Avocados. Many thousand acres are planted this way, and from a distance these coffee estates look like an immense forest. The fruit of the avocado is therefore a by-product, only a small percentage being utilized. The avocado tree producing the very best fruit on each estate is reserved for the private use of the owner, and never gets into the market. On account of having lived most of my life in Spanish America and having friends there, I succeeded in securing buds from these especially fine trees.

After due time I returned to Guatemala City, traveling nights with Indian packers. There I had a refrigerator and secured ice to keep the buds dormant. From there I went to San Jose, the port on the Pacific side, and arrived two hours before the steamer was due to start. I found that the American Consul

had gone to Guatemala City, thinking that nothing more would arrive for that steamer; and I had no one to sign the Consular Invoice. I held the steamer two hours by use of U. S. gold and finally shipped the buds contraband, which caused more trouble, delay and telegrams at San Francisco. At last I reached home with forty thousand buds. I budded them and eighty-one grew. At least I was lucky in one thing, some of every variety I brought lived excepting one; and today I have some of the finest trees ever seen.

I would classify the avocado under five distinct groups:—

- I. Thin Skin.
- II. Leather Skin.
- III. Thick Skin.
- IV. Hard Shell.
- V. Chute.

I. Thin Skin, most common type.

1. Anise
 - a. Mexican type.
 - b. Extremely hardy.
 - c. DOES NOT PEEL.
2. Non-anise
 - a. Moderately hardy.
 - b. DOES NOT PEEL.
3. Shape from oblong-pyriform to bottle-necked.
4. Flowers scattered on limb.
5. Fruit matures in 6 to 18 months, according to variety.

II. Leather Skin, West Indian type, as Florida Trapp. Found along coast of mainland also.

1. Not hardy.
2. Skin
 - a. Thick.
 - b. Soft.
 - c. Pliable.
 - d. PEELS EASILY.
3. Flavor—poor.
4. Shape—from oblong-pyriform to round.
5. Flowers—SCATTERED ON LIMB.
6. Fruit—matures in 6 to 18 months, according to variety.

III. Thick Skin, wrongly called Guatemalan type.

1. Moderately hardy .
2. Skin
 - a. Harder than West Indian type.
 - b. ALWAYS PEELS.
 - c. Of STIFF leather texture.
3. Seed coat generally sticks to seed.
4. Shape—from oblong-pyriform to round.
5. Flowers SCATTERED ON LIMB.
6. Fruit matures in 6 to 18 months, according to variety.

IV. Hard Shell GENUINE Guatemalan type.

1. Extremely hardy.
2. Shape, 50% round.
50% oblong-pyriform.

3. Skin
 - a. Not thicker than thick skin.
 - b. Granular in texture (resembles a piece of veneer) does not tear, but makes a jagged break.
 - c. Inclined to be rough.
4. Seed
 - a. Generally firm in cavity.
 - b. Seed coats ALWAYS STICK TO SEED.
5. Flesh distinctly differentiated from skin.
6. Flowers on 1 inch CIRCLE AROUND BRANCH.
7. Fruit, rich, nutty flavor. Generally matures in 6 to 8 months, never exceeding one year.
8. Foliage, DISTINCT IN COLORING, attracts attention.
9. Flesh should be scooped out of shell.

V. Chute, found in Guatemala.

1. Moderately hardy.
2. Skin, very rough.
3. Shape, much like crooked-necked squash.
4. Size
 - a. 12 to 18 inches (length)
 - b. 3 to 5 pounds (weight)
5. Seed
 - a. Long.
 - b. Often loose.
6. Flesh
 - a. Very rich and oily.
 - b. Cream colored.
 - c. Fibrous.
 - d. Almost liquid in consistency.
7. Fruit mature in one year.
8. End of branches blunt.
9. Hard to propagate.

The Thin Skin, the Thick Skin and the Hard Shell types are all grown in Guatemala. The only locality north of Panama in which I found the Hard-Shell type was Guatemala. Many Thick-Skin varieties are sold under the name Hard-Shell. I understand that the Dickinson is a Hard-Shell. The Thick Skin WILL PEEL and the Hard Shell WILL NOT.

The average result of planted Guatemala HARD-SHELL AVOCADO SEEDLINGS of the same type grown under the same conditions are:—

- I. Trees
 - 25% prolific bearers.
 - 25% do not bear at all or very little.
- II. Fruit
 - 1/10 of 1% are of FIRST CLASS FLAVOR.
 - 1% fairly good flavor.
- III. Harvest time
 - 90% from October to March.
 - 10% from March to October.



Tree from Which "Linda" Buds Were Taken in Guatemala.

THE GUATEMALA AVOCADO.

I lived thirty years in Mexico, Central America and South America, and I found the best avocados in Guatemala, Central America, where the genuine Hard-Shells are found. Guatemala Hard-Shells grow at an elevation of 5000 to 7000 feet. Below 5000 feet the Thick-Skin and the Thin-Skin avocados are also found, although few have the anise odor of the Mexican type. The flavor of the best Guatemala Hard-Shell is rich and nutty and far superior to that of any other. On account of the hard shell, the meat must be scooped out; the fruit cannot be peeled. No other avocado, I know, has its flowers in a circle around the branch, as the Guatemala Hard-Shell does.



Fruit of the Linda Variety, Actual Size—Seed 15%.

THE FUTURE COMMERCIAL AVOCADO.

The most important commercial factor is FLAVOR. The consumer will insist on the RICH NUTTY FLAVOR. The second factor is the HARD SHELL; because of its PROTECTION IN SHIPPING, and also of the PROTECTION OF THE FRUIT UPON THE TREE. Third, the SEED must be TIGHT IN THE CAVITY, to keep from bruising the fruit from within. Fourth, the fruit should weigh from one to one and one-half pounds each. Fifth, everything else being equal, the round fruit will be preferred, for packing purposes. Sixth, at present winter bearing varieties are much more in demand and bring the best prices.

WHERE TO PLANT AVOCADOS.

Hard-Shell avocados will thrive in any good strong soil, with good drainage, in any location where citrus fruit will grow.

NUMBER OF TREES PER ACRE.

Plant the trees 1 rod apart. This makes 160 trees per acre. In the beginning while the trees are small you will have four to six times the crop the man has who plants 30 or 40 trees per acre. 160 trees shade the ground well and the trees are also better able to withstand the wind. There is no possible injury done to tree or fruit by so doing. The Hard-Shell avocado can stand more abuse on the tree than any avocado I know. When it becomes necessary, in 10 or 15 years, cut out some of the trees. Suppose you bought 160 trees at \$5.00 each and one acre of land at \$800.00. Each tree, with its proportionate amount of land, would have cost you \$10.00. With 40 trees per acre, each tree, with its proportionate amount of land would have cost you \$25.00; and 30 trees per acre, each tree with its proportionate amount of land would have cost you about \$32.00. The expense of labor and water per tree is much less for 160 trees than for 40 or 30 trees per acre. With the same capital invested, in the first 15 years, you will make much more than the man who planted only 40 or 30 trees per acre. With 160 trees per acre 50% of your capital is invested in producing. With 40 trees per acre, but 20% of your capital is invested in producing. With 30 trees per acre only 15% of your capital is invested in producing.

CULTIVATION.

Plant trees 2 inches deeper than they were in the nursery. Do not cultivate below the surface of the soil. The avocado develops no tap root after the first year, and if the ground around the trees is plowed and then irrigated, it becomes so soft that a moderate wind will cause the trees to lean badly. Trees that are not cultivated bear the best fruit. The feeder-roots of an avocado are from 4 to 12 inches below the surface of the ground, if the tree is planted correctly. They are very brittle. These roots should not be disturbed under any consideration. Root pruning is very harmful. My ground has not been cultivated since the trees were planted except with a hoe to keep the weeds down. A permanent cover crop is ideal.



Tree from Which "Knight" Buds Were Taken, in Guatemala.

STAKING.

The trees should be staked against the prevailing wind, but the stake should be far enough away from the tree so as not to allow the branches to rub against it. It badly injures the branches to let them rub the stake, and new branches will not start next it, which cause the tree to be one sided. Wire is not good to tie a tree up with, because it slips so easily. It is best to use hemp packing for small trees, such as is used for steam packing. This is not strong enough for large trees. Wind breaks will be necessary in most California groves.



Fruit of Queen Variety, Actual Size—Seed $7\frac{1}{2}\%$.

IRRIGATION.

Avocado trees need lots of water. The ground should be kept damp for a week after planting, and the trees should be shaded for a month or more. Gradually reduce irrigation; so as to give the trees in one month 2 or 3 times the amount of water required for citrus trees. Irrigate at least every two weeks. With the ground hard less water will be taken up, but irrigate often. If the land has good drainage and will not sour, the more water used the better. During the first year, make a basin around each tree, but leave a ring of hard soil around the base of the tree to keep the tree firmly in position. Water will not hurt the bark of the tree. Water should soak in about the ends of the roots and penetrate back toward the tree to draw the feeder roots as far away from the base of the tree as possible. The portion of ground beyond the ends of the roots should be well softened, in order to give an easy entrance to the feeder roots. Keep a mulch around the tree in the basin; and remember the more water without souring the soil, the better. Keep the trees as near as possible at the same state of moisture from flowering time until the fruit are well grown. This will tend to avoid the dropping of fruit. The checking of the flow of sap is the principal cause of dropping fruit.

FERTILIZATION.

To a certain extent fertilization is good, but if the soil is good it will not require much. A tree will make more of a growth if fertilized heavily, but the fruit will lose in quality. If it is too heavily fertilized the tree will not be good to propagate from. Varieties budded from a tree which has been over fertilized are liable to turn yellow and die within a year or two. Such trees have the same appearance of the trees I have seen growing in corrals in the tropics. I have fertilized one tree only, but I have cut no buds from that tree. Its growth is 25% greater than that of the unfertilized trees.

RELIABLE LITERATURE ON THE AVOCADO.

The best articles I have found written about the avocado are the following:

1. "The Avocado," by G. N. Collins, in Bulletin No. 77, Bureau of Plant Industry, U. S. Department of Agriculture. Price 10 cents.
2. "The Avocado in California," by Ira J. Cordit, Agriculture Experimental Station, Berkeley, California.

DESCRIPTION of VARIETIES IMPORTED from GUATEMALA,
By E. E. Knight.

All of these varieties are Hard Shells from the highlands of the Republic of Guatemala, Central America, selected, imported and propagated by E. E. Knight.

GROWTH OF BUDDED "REY" TREE.

Budded July 6, 1914.

Transplanted March 10, 1915.



Picture Taken Oct. 1, 1915.



Picture Taken Aug. 6, 1916.

REY—Number 1.

Buds taken from tree in Department of Jalapa, Guatemala, at an elevation of 5200 feet.

Exterior fruit

1. Round
2. Diameter, 3½ inches
3. Weight, 1 pound
4. Surface, slightly rough
5. Skin, hard shell, woody
6. Color, green

Flesh

1. Firm
2. Yellow
3. Free from fiber
4. Rich nutty flavor

Seed

1. Medium
2. Tight in cavity

Price—\$5.00 per tree, balled at nursery.

Tree

1. Prolific
2. Hardy
3. Fine grower
4. Round
5. Small
6. Beautiful foliage
7. Blooms first of June (in Guatemala)
8. Fruit from following November until end of March (in Guatemala)

GROWTH OF BUDEDDED "QUEEN" TREE.

Budded July 2, 1914.

Transplanted March 10, 1915.



Picture Taken Oct. 1, 1915.



Picture Taken Aug. 6, 1916.

QUEEN—Number 28.

Buds taken from Department of Antigua, Guatemala, at an elevation of 5500 feet.

Exterior fruit

1. Oblong (pyriform)
2. 5 inches in length
3. Weight, 1½ pounds
4. Skin, slightly rough, Hard
Shell, woody
5. Color, purple

Flesh

1. Firm
2. Yellow
3. Free from fiber
4. Rich nutty flavor

Seed

1. Small
2. Tight in cavity

Price—\$10.00 per tree, balled at nursery.

Tree

1. Prolific
2. Large
3. Hardy
4. Fine grower
5. Spreading wide
6. Blooms first of June (in Guatemala)
7. Fruit from following November first to last of March (in Guatemala)

GROWTH OF BUDDED "KNIGHT" TREE.

Budded July 2, 1914.

Transplanted March 10, 1915.



Picture Taken Oct. 1, 1915.



Picture Taken Aug. 6, 1916.

KNIGHT—Number 27.

Buds taken from Department of Antigua, Guatemala, at an elevation of 5500 feet.

Exterior fruit

1. Round
2. Diameter, 4 inches
3. Weight, 1½ pounds
4. Surface, slightly rough
5. Skin, Hard Shell, woody
6. Color, green

Flesh

1. Firm
2. Yellow
3. Free from fiber
4. Rich nutty flavor

Seed

1. Medium size
2. Tight in cavity

Price—\$7.50 per tree, balled at nursery.

Tree

1. Prolific
2. Hardy
3. Fine grower
4. Round
5. Medium size
6. Beautiful foliage
7. Bloom first of June (in Guatemala)
8. Fruits from following November until last of March

GROWTH OF BUDDED "LINDA" TREE.
 Budded July 1, 1914. Transplanted March 10, 1915.



Picture Taken Oct. 1, 1915.



Picture Taken Aug. 6, 1916.

LINDA—Number 29.

Buds taken from Department of Antigua, Guatemala, at an elevation of 5500 feet.

Exterior fruit

1. Round
2. Diameter, 4½ inches
3. Weight, 2 pounds
4. Color, deep purple
5. Skin, Hard Shell, woody

Flesh

1. Firm
2. Yellow
3. Free from fiber
4. Rich nutty flavor

Seed

1. Medium size
2. Tight in cavity

Price—\$5.00 per tree, balled at nursery.

All trees are sold with the **DISTINCT UNDERSTANDING** that no buds are to be taken for any purpose whatsoever from the Rey and Linda varieties sooner than December 31, 1917; nor from the Queen and Knight varieties sooner than December 31, 1918. No trees are sold except under the above restrictions.

Tree

1. Prolific
2. Large
3. Rank grower, bottom branches must be pruned
4. Rich foliage
5. Blooms first of June (in Guatemala)
6. Fruits from following November until the last of March, (in Guatemala)

GUATEMALA AVOCADO NURSERY
 YORBA LINDA, ORANGE CO., CAL.

